



JOINT CANADA-UNITED STATES
NATIONAL STANDARD

STANDARD FOR SAFETY

ANSI/CAN/UL/ULC 1201:2016, Sensor Operated Backwater Prevention Systems



ANSI/UL 1201-2016



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UL Standard for Safety for Sensor Operated Backwater Prevention Systems, ANSI/CAN/UL/ULC 1201

First Edition, Dated December 14, 2016

Summary of Topics

The First Edition of the Standard for Sensor Operated Backwater Prevention Systems, ANSI/CAN/UL/ULC 1201.

The new requirements are substantially in accordance with Proposal(s) on this subject dated June 10, 2016.

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December 14, 2016

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UL/ULC 1201

Standard for Sensor Operated Backwater Prevention Systems

First Edition

December 14, 2016

This ANSI/CAN/UL/ULC Safety Standard consists of the First Edition.

The most recent designation of ANSI/UL 1201 as an American National Standard (ANSI) occurred on December 14, 2016. ANSI approval for a standard does not include the Cover Page, Transmittal Pages, Title Page, Preface or SCC Foreword.

This standard has been approved as a National Standard of Canada (NSC) by the Standards Council of Canada (SCC).

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Preface

This is the First Edition of the Standard for Sensor Operated Backwater Prevention Systems.

This Edition of the Standard has been formally approved by the UL/ULC Joint Committee on Prevention of Storm and Sanitary Backflow.

This Standard has been developed in compliance with the requirements of SCC and ANSI for accreditation of a Standards Development Organization.

Only metric SI units of measurement are used in this Standard. If a value for measurement is followed by a value in other units in parentheses, the second value may be approximate. The first stated value is the requirement.

Appendix A, identified as Informative, is for information purposes only.

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This ANSI/CAN/UL/ULC 1201 Standard for Safety is under continuous maintenance, whereby each revision is ANSI/CAN approved upon publication. If no revisions occur, the initiation of the review of this Standard will commence within 5 years of the date of publication.

The review and action to revise or reaffirm this Standard will not exceed 5 years from the date of publication, unless the Standard is identified as fitting within a stabilized category, whereby the review will commence within the appropriate time frame set out by ULC Standards and Underwriters Laboratories Inc.

In Canada, there are two official languages, English and French. All safety warnings must be in French and English. Attention is drawn to the possibility that some Canadian authorities may require additional markings and/or installation instructions to be in both official languages.

This is a First Edition joint National Standard of Canada and American National Standard.

Comments or proposals for revisions on any part of the Standard may be submitted to UL or ULC at any time. Proposals should be submitted via a Proposal Request in UL's On-Line Collaborative Standards Development System (CSDS) at <http://csds.ul.com>.

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This list represents the STP 1201 membership when the final text in this standard was balloted. Since that time, changes in the membership may have occurred.

STP 1201 Membership

Name	Representing	Interest Category*	Region
Bob Bielawski	Mainline Backflow Products Inc.	Producer	USA
Robert Burnham	Zurn Industries	Producer	USA
Maribel Campos	ICC Evaluation Service LLC	Testing and Standards	USA
Mark Harrold	City of Lethbridge	Producer	Alberta
Edwin Ho	International Association of Plumbing and Mechanical Officials (IAPMO)	Testing and Standards	Canada
Paul Holland	City of Greater Sudbury	AHJ	Ontario
Christopher Johnson	Fluids Controls Institute (FCI)	General	USA
William LaRose	self	General	Canada
Christopher McLellan	Canadian Home Builders Association	General	Canada
Brian Murphy	ULC Standards	STP Co-Chair - Non-voting	Canada
Joe Musso	Underwriters Laboratories Inc.	STP Co-Chair - Non-voting	USA
Brian Patriquin	Inflotrolix	Producer	Canada
Mark Ramlochan	ULC Standards	STP Co- Project Manager - Non-voting	Canada
Shabbir Rawalpindiwala	Kohler Co	General	USA
Dan Sandink	Institute for Catastrophic Loss Reduction (ICLR)	AHJ	Canada
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* Testing and Standards interest category is non-voting for SCC.			

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This Standard is intended to be used for conformity assessment.

The intended primary application of this standard is stated in its scope. It is important to note that it remains the responsibility of the user of the standard to judge its suitability for this particular application.

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INTRODUCTION

1 Scope

1.1 This standard covers backwater prevention systems that use sensors, controls and mechanisms for the prevention of backflow for sanitary drainage and storm systems and specifies minimum requirements for materials, mechanical, electrical, performance tests and markings.

1.2 The purpose of this Standard is to enhance health and safety by:

- a) Specifying acceptable criteria for sensor operated backwater prevention systems;
- b) Serving as a guide for producers, distributors, architects, engineers, contractors, installers, inspectors and users; and
- c) Promoting understanding regarding materials and manufacturing of sensor operated backwater prevention systems.

2 Units of Measurement

2.1 Only metric SI units of measurement are used in this Standard. If a value for measurement is followed by a value in other units in parentheses, the second value may be approximate. The first stated value is the requirement.

3 Reference Publications

3.1 See Annex A for a list of publications referenced in this standard. Any undated reference to a code or standard appearing in the requirements of this standard shall be interpreted as referring to the latest edition of that code or standard. When the latest edition of a standard is not applicable, the appropriate edition is indicated accordingly in Annex A.

4 Glossary

4.1 **SEALING ELEMENT** – A pneumatic or mechanical component in a backwater prevention system that when deployed or activated, prevents the reverse flow of storm or sanitary drainage.

CONSTRUCTION

5 General

5.1 General

5.1.1 Sensor operated backwater prevention systems shall consist of

- a) An electronic control panel;
- b) A retractable sealing element;
- c) Electrical cables and connectors to connect the control panel to the sealing element;
- d) A service or cleanout cap;
- e) Additional components such as gaskets; and
- f) The installation hardware.

5.1.2 Caps shall firmly secure and seal the sealing element inside the fitting.

5.1.3 The sealing element shall comply with the performance tests specified.

5.1.4 If the sealing element is a pneumatic type device, the air tube shall be attached to the sealing element using a means to provide a secure tensile attachment. The air tube connection to the sealing element shall be capable of withstanding for 1 min a pull of 10 N applied to the tube without causing the tube to detach from the sealing element.

5.1.5 The sealing element shall be properly positioned and secured in its installed position using manufacturer provided installation hardware, in accordance with the manufacturer's installation instructions.

5.2 Grade

5.2.1 The sensor operated backwater prevention systems shall be designed and constructed such that when installed in its proper operating position in the drainage system, the upper face of the cap shall be parallel to the invert to the outlet so that the slope of the drain can be readily determined by placing a level on the top of the cap.

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5.3 Access

5.3.1 The sensor operated backwater prevention systems shall be designed to provide access to working components for repair or replacement. The size of the access shall be based upon the requirements necessary to perform the repair or maintenance. The access cap shall be water and gas tight once installed.

6 Control Unit Frame and Enclosure

6.1 General

6.1.1 A control unit shall be so formed and assembled that it has the strength and rigidity necessary to resist the abuses to which it is likely to be subjected in service without adversely affecting its performance and without introducing fire, shock, or accident hazard due to total or partial collapse with resulting reduction of spacings, loosening or displacement of parts or other serious defects.

6.1.2 All electrical parts of a control unit shall be enclosed to provide protection against contact with uninsulated live parts.

6.1.3 There shall be adequate space within a terminal or wiring compartment for completing all wire connections as specified by the installation wiring diagram.

6.1.4 An enclosure shall have suitable means for mounting, which shall be accessible without disassembling any operating part of the unit. Removal of a completely assembled panel or printed wiring board to mount the enclosure is not considered to be disassembly of an operating part.

6.1.5 A compartment enclosing electrical parts shall not be open to the floor or other support on which a unit rests.

6.2 Cast metal enclosures

6.2.1 The thickness of cast metal for an enclosure shall be as indicated in Table 1, except that cast metal having a thickness 0.8 mm less than that indicated in the Table may be employed if the surface under consideration is curved, ribbed, or otherwise reinforced, or if the shape and/or size of the surface is such that equivalent mechanical strength is provided.

6.2.2 If threads for the connection of conduit are tapped all the way through a hole in an enclosure wall, or if an equivalent construction is employed there shall be not less than 3-1/2 nor more than 5 threads in the metal, and the construction shall be such that a standard conduit bushing can be properly attached.

6.2.3 If threads for the connection of conduit are tapped only part of the way through a hole in an enclosure wall, there shall be not less than five full threads in the metal, and there shall be a smooth, well-rounded inlet hole for the conductors which shall afford protection to the conductors equivalent to that provided by a standard conduit bushing.

6.3 Sheet metal enclosures

6.3.1 The thickness of sheet metal employed for the enclosure of a control unit shall be not less than that indicated in Table 2, except that sheet metal of two gauge sizes lesser thickness may be employed if the surface under consideration is curved, ribbed, or otherwise reinforced, or if the shape and/or size of the surface is such that equivalent mechanical strength is provided.

6.3.2 At any point where conduit or metal-clad cable is to be attached, sheet metal shall be of such thickness or shall be so formed or reinforced that it will have stiffness at least equivalent to that of uncoated flat sheet steel having a minimum thickness of 1.35 mm.

6.3.3 A plate or plug for an unused conduit opening or other hole in the enclosure shall have a thickness of not less than: 0.36 mm for steel or 0.48 mm for nonferrous metal for a hole having a 6.4 mm maximum dimension; and 0.69 mm steel or 0.8 mm nonferrous metal for a hole having a 35 mm maximum dimension.

6.3.4 A closure for a larger hole shall have a thickness equal to that required for the enclosure of the device or a standard knockout seal shall be used. Such plates or plugs shall be securely mounted.

6.3.5 A knockout in a sheet-metal enclosure shall be reliably secured but shall be capable of being removed without undue deformation of the enclosure.

6.3.6 A knockout shall be provided with a flat surrounding surface adequate for proper seating of a conduit bushing, and shall be so located that installation of a bushing at any knockout likely to be used during installation will not result in spacings between uninsulated live parts and the bushing of less than the requirements in this Standard.

6.4 Nonmetallic enclosures

6.4.1 A nonmetallic enclosure or enclosure part shall have mechanical strength and durability and be so formed that operating parts will be protected against damage, and shall resist the abuses likely to be encountered during installation and normal use and service, but in any case, the mechanical strength shall be at least equivalent to a sheet-metal enclosure of the minimum thickness specified in Table 2. The enclosure or enclosure part shall protect persons from shock hazard.

6.4.2 Among the factors taken into consideration when judging the acceptability of a nonmetallic enclosure with respect to aging are: the mechanical strength; resistance to impact; moisture-absorptive properties; combustibility and resistance to ignition from electrical sources; dielectric strength, insulation resistance, and resistance to arc tracking; and resistance to distortion and creeping at temperatures to which the material may be subjected under conditions of normal and abnormal usage.

6.4.3 The continuity of the grounding system shall not rely on the dimensional integrity of the nonmetallic material.

6.5 Electric shock

6.5.1 Any part that is exposed only during operator servicing shall not present the risk of electric shock. See Electric Shock Current Test, Subsection 33.14.

6.5.2 Each terminal provided for the connection of an external antenna shall be conductively connected to the supply circuit grounded conductor. The conductive connection shall have a maximum resistance of 5.2 M Ω , a minimum wattage rating of 1/2 W, and shall be effective with the power switch in either the on or off position.

6.5.3 The conductive connection need not be provided if such a connection is established in the event of electrical breakdown of the antenna isolating means, the breakdown does not result in a risk of electric shock, and in a construction employing an isolating power transformer, the resistance of the conductive connection between the supply circuit and chassis does not exceed 5.2 M Ω .

6.5.4 The maximum value of 5.2 M Ω specified in Clauses 6.5.2 and 6.5.3 is to include the maximum tolerance of the resistor value used; that is, a resistor rated 4.2 M Ω with 20% tolerance or a resistor rated 4.7 M Ω with a 10% tolerance is acceptable. A component comprised of a capacitor with a built-in shunt resistor that complies with the requirements for antenna isolating capacitors may be rated a minimum of 0.25 W.

6.5.5 The insertion in any socket of any component used in the product shall not result in a risk of electric shock.

6.6 Ventilating openings

6.6.1 Ventilating openings in an enclosure, including perforated holes, louvres, and openings protected by means of wire screening, expanded metal, or perforated covers, shall be of such size or shape that no opening will permit passage of a rod having a diameter of 3.6 mm. An enclosure for fuses or other overload-protective devices and provided with ventilating openings shall afford adequate protection against the emission of flame or molten metal.

6.6.2 Except as noted in Clause 6.6.3, perforated sheet metal and sheet metal employed for expanded-metal mesh shall be not less than 1.07 mm in average thickness, 1.17 mm if zinc coated.

6.6.3 If the indentation of a guard or enclosure will not alter the clearance between uninsulated, movable, live parts and grounded metal so as to affect performance adversely or reduce spacings below the minimum values given under Spacings, Subsection 21, 0.53 mm expanded-metal mesh (0.61 mm if zinc coated) may be employed, provided that the exposed mesh on any one side or surface of the device so protected has an area of not more than 465 cm² and has no dimension greater than 300 mm, or that the width of an opening so protected is not greater than 90 mm.

6.6.4 The wires of a screen shall be not smaller than 16 AWG and the screen openings shall be not greater than 3.2 mm by 3.2 mm.

7 Metal Covers and Doors

7.1 An enclosure cover shall be hinged, sliding, pivoted or similarly attached if it provides ready access to fuses or any other over current-protective device the normal functioning of which requires renewal, or if it is necessary to open the cover in connection with the normal operation and maintenance of the unit.

7.2 With reference to the requirement of the Clause 7.1, normal operation is considered to be operation of a switch for testing or for silencing an audible signal appliance or operation of any other component of a unit, which requires such action in connection with its intended performance.

7.3 A hinged cover is not required where the only fuse(s) enclosed is intended to provide protection to portions of internal circuits such as may be employed on a separate printed wiring board or circuit subassembly, to prevent excessive circuit damage resulting from a fault. The use of such a fuse(s) is acceptable if the following or equivalent marking is indicated on the cover:

“WARNING: CIRCUIT FUSE(S) INSIDE – Disconnect Power Prior To Servicing.”

and

« AVERTISSEMENT: CIRCUIT FUSIBLE À L'INTÉRIEUR – Couper le courant avant d'ouvrir ».

7.4 A hinged cover shall be provided with a latch, screw, or catch to hold it closed. An unhinged cover shall be securely held in place by screws or the equivalent.

8 Glass Panels

8.1 Glass covering an observation opening shall be held securely in place so that it cannot be readily displaced in service and shall provide adequate mechanical protection for the enclosed parts. The thickness of a glass cover shall be not less than that indicated in Table 3.

8.2 A glass panel for an opening having an area of more than 930 cm², or having any dimension greater than 300 mm, shall be supported by a continuous groove not less than 5 mm deep along all four edges of the panel.

8.3 A transparent material other than glass employed as a cover over an opening in an enclosure shall have equivalent mechanical strength to that of glass, not become a fire hazard, distort, nor become less transparent at the temperature to which it may be subjected under normal or abnormal service conditions.

9 Corrosion Protection

9.1 Except as indicated in Clause 9.2, iron and steel parts, except bearings, and the like, where such protection is impracticable, shall be suitably protected against corrosion by enamelling, galvanizing, sherardizing, plating, or other equivalent means.

9.2 The requirement of Clause 9.1 applies to all enclosing cases whether of sheet steel or cast iron, and to all springs and other parts upon which proper mechanical operation may depend. It does not apply to minor parts such as washers, screws, bolts, and the like, if the failure of such unprotected parts would not be liable to result in a hazardous condition or adversely affect the operation of the unit. Parts made of stainless steel, properly polished or treated if necessary, do not require additional protection against corrosion. Bearing surfaces should be of such materials and design as to ensure against binding due to corrosion.

10 Insulating Materials

10.1 Insulating materials for the support or separation of live parts shall be of a nonflammable, moisture-resistant insulating material, such as porcelain, phenolic or cold-moulded composition, or other material which is recognized for the support of live parts.

10.2 A base mounted on a metal surface shall be provided with an insulating barrier between the mounting surface and all live parts on the underside of the base which are not staked, upset, sealed, or equivalently prevented from loosening so as to prevent such parts and the ends of replaceable terminal screws from coming in contact with the supporting surface.

10.3 Vulcanized fibre may be used for insulating bushings, washers, separators, and barriers, but not for the sole support of live parts.

10.4 The thickness of a flat sheet of acceptable insulating material, such as phenolic composition employed for panel-mounting parts, shall be not less than that indicated in Table 4.

10.5 A terminal block mounted on a metal surface which may be grounded shall be provided with an insulating barrier between the mounting surface and all live parts on the underside of the base which are not staked, upset, sealed or equivalently prevented from loosening so as to prevent such parts and the ends of replaceable terminal screws from coming in contact with the supporting surface.

10.6 A countersunk, sealed part shall be covered with a waterproof insulating compound which will not melt at a temperature 15°C higher than the maximum normal operating temperature of the assembly, and at not less than 65°C in any case. The depth or thickness of sealing compound shall be not less than 3.2 mm.

11 Mounting of Electrical Components

11.1 All parts of a residential control unit shall be securely mounted in position and prevented from loosening or turning if such motion may affect adversely the normal performance of the control unit, or may affect the risk of fire and accident hazard incident to the operation of the control unit.

11.2 A switch, lampholder, attachment-plug receptacle, or plug connector shall be mounted securely and, except as noted in Clauses 11.3 and 11.4, shall be prevented from turning.

11.3 The requirement that a switch be prevented from turning may be waived if all the following conditions are met:

- a) The switch is of a push button or other type that does not tend to rotate when operated (a toggle switch is considered to be subject to forces that tend to turn the switch during normal operation of the switch);
- b) The means of mounting the switch makes it unlikely that operation of the switch will loosen the switch; or
- c) The spacings are not reduced below the minimum acceptable values if the switch does rotate.

11.4 A lampholder of a type in which the lamp cannot be replaced, such as a neon pilot or indicator light in which the lamp is sealed in by a nonremovable jewel, need not be prevented from turning if rotation cannot reduce spacings below the minimum acceptable values.

11.5 The means for preventing turning of a device is to consist of more than friction between surfaces; for example, a suitable lockwasher, properly applied, is acceptable as the means for preventing a small stem-mounted switch or other device having a single-hole mounting means from turning.

11.6 Uninsulated live parts, including terminals, shall be secured to their supporting surfaces by methods other than friction between surfaces, so that they will be prevented from turning or shifting in position if such motion may result in reduction of spacings to less than those required. The security of contact assemblies shall be such as to ensure the continued alignment of contacts.